REMARKS

Reconsideration is respectfully requested in view of any changes to the claims and the remarks herein. Please contact the undersigned to conduct a telephone interview in accordance with MPEP 713.01 to resolve any remaining requirements and/or issues prior to sending another Office Action. Relevant portions of MPEP 713.01 are included on the signature page of this amendment.

Claims 42-43 and 47 have been rejected under 35 USC 112, first paragraph as failing to comply with the written description requirement. Applicant respectfully disagrees.

In regards to claim 42 the specification teaches at page 8, lines 5-9

> **It has been found that when the selected cell 50 is heated** by a predetermined amount, e.g., 50-100.degree. C., the magnetic field required to switch that specific cell can be reduced. **If the magnetic field is applied simultaneously**, or at least before the layer 51 recools, only the heated cell will be written, provided that the magnetic field strength is both larger than the coercivity of the heated cell and smaller than the coercivity of the unheated cell. (Emphasis added.)

Thus claim 42 is supported by the specification.

In regards to claim 43 the specification teaches at page 8, lines 5-9

> **It has been found that when the selected cell 50 is heated** by a predetermined amount, e.g., 50-100.degree. C., the magnetic field required to switch that specific cell can be reduced. **If the magnetic field is applied** simultaneously, or at least **before the layer 51 recools,** only the heated cell will be written, provided that the magnetic field strength is both larger than the coercivity of the heated cell and smaller than the coercivity of the unheated cell. (Emphasis added.)

Thus claim 43 is supported by the specification.

In regards to claim 47 the specification teaches at page 5, lines 5-8

> FIGS. 3(a) and 3(b) illustrate a geometry typically proposed for addressing the storage cell 50. The bias current indicated by the arrow through the cell 50 flows from bit line 5 to word line 2, as shown in FIG. 3(a), while the magnetic field-generating current flows in either bit line 5 or word line 2 as indicated by the arrows as shown in FIG. 3(b).

Thus claim 47 is supported by the specification.

Claims 21-24, 26-33, 35-40 have been rejected under 35 USC 101 for double patenting as claiming the same invention as that of claims 1-19 of prior US Patent 6,724,674. Applicant respectfully disagrees. Claims 1-19 of US patent 6,724,674 are directed to a memory storage device which is a different statutory class from claims 21-24, 26-33 and 35-40 of the present invention which are directed to a method. Thus claims 21-24, 26-33, and 35-40 of the present application are not directed to the same invention as claims 1-19 of US 6,724,674 and applicant respectfully requests that this rejection be withdrawn.

Claims 41-49, 51-58 and 60 have been rejected under 35 USC 102 (b) as anticipated by us Patent 5,695,864 (US '864). Applicant respectfully disagrees.

Referring to claim 41 at page 8, lines 1-3 of the Office Action (OA), the Examiner states that US '864 at Col. 2, lines 1-3 discloses "a method of writing to a magnetic memory element of an array of magnetic memory elements." Applicant respectfully disagrees. US '864 Col. 2, lines 1-3 make no reference to an array of magnetic memory elements. The term array does not appear in the specification of US '864.

The Examiner further states "heating the memory element (Column 5, lines 45-47) wherein the memory element is heated by passing a current through a conductor (Figure 4)." Applicant disagrees with the Examiner's interpretation of Col. 5, lines 45-47 which states "These novel devices exhibit very low power consumption and considerable device efficiency with acceptable heating over small distance scales." There is nothing in this teaching directed to "heating the

memory element" as part of a method of writing to a magnetic "memory element" as recited in applicants' claim 41.

The Examiner refers to US '864 Col. 2, lines 29-35 in support of "applying at least one magnetic field to the memory element." Applicants respectfully disagree. US '863 Col. 2, lines 29-35 recites:

> It is a fundamental fact that the macroscopic magnetization intensity of a magnet such as iron arises from the cooperative mutual alignment of elementary magnetic moments carried by electrons. An electron is little more than a mass particle carrying an electrostatic charge which spins at a constant rate, like a planet about its axis. The electric current of this spin induces a surrounding magnetic field distribution resembling that which surrounds the Earth.

This passage describes properties of an electron and is not directed to "applying at least one magnetic field to the memory element" for "writing to a magnetic memory element" as claimed in claim 41.

Thus, applicants respectfully submit that claim 41 is not anticipated by US '864. The Examiner has not identified where US '864 teaches using "heating the memory element … by passing a current through a conductor, and applying at least one magnetic field to the memory element" for "writing to a magnetic memory element" as recited in claim 41 and all claims which depend therefrom. Moreover, the first sentence of The Summary of the Invention of US '846 at Col. 1, lines 25-28, teaches "This invention provides new means of dynamically remagnetizing … without the use of an externally applied magnetic field." Thus US '846 does not teach "applying at least one magnetic field to the memory element" as claimed.

In regards to claims 44-46, 53-54 and 58, the Examiner states US '846 at Col. 7, lines 59-64 teaches "heating raises the temperature of the memory element by about 5 C^0 to 10 C^0 above the compensation temperature." US '846, Col. 7, lines 59-67 teaches:

Considering the current density $j=2\times10^7$ A/cm^2 passing through F1 using the nominal parameter values of Eq. (2), electromigration is a concern at ambient temperature. Long-lived ambient-temperature devices are obtainable by 1) avoiding grain boundaries through growing layers and contacts epitaxially, 2) developing higher-polarization magnets with low M_s, and 3) making the electrical connectors of gold, which is known to be highly resistant to electromigration.

There is nothing in this text from US '846 Col. 7 lines 59-67 directed to "heating increases the temperature of the memory element by about 5^0 C to 10^0 C above the compensation temperature" as stated by the Examiner.

Also in regards to US '846 Col. 7, lines 59-67 the Examiner states "wherein the heating raises the temperature of the memory element." US '846 Col. 7, lines 59-67 is quoted above. There is nothing in this teaching directed to "heating raises the temperature of the memory element" as asserted by the Examiner.

Also in regards to US '846 Col. 8, lines 20-25, the Examiner states "wherein a junction is heated by passing said current through said conductor."

US '846 Col. 8, lines 16-25 teaches:

In practice, the thickness must satisfy $D_s \sim 1$ nm otherwise accidental bridges of magnetic material fill the "pinholes" in the barrier, creating a conventional exchange coupling between F1 and F2 which interferes with the operation of this invention. Since $k=10$ nm^{-1}, typically $\bar{T}_{bs} \sim \exp(-20) \approx 10^{-6}$ and the power Φ is $T_m/T_b=10^5$ times greater in the case of a magnetic tunneling junction. Therefore, the effect described in the above reference would not be practiced in any of the devices made possible by the present invention.

There is nothing in this teaching directed to "a junction is heated by passing said current through said conductor."

The Examiner further states regarding claims 48-55-57 and 60 that US '846 discloses "an information storage device (Figure 6) comprising: an array of magnetic memory elements (Figure 6, M1, M2)." The Examiner appears to interpret M1 and M2 as two magnetic memory elements. M1 and M2 are magnetic moments, not separate devices. See US '846 Col. 6, lines 64-66, which teaches "Magnet F_2, whose time-dependent moment M_2, forms [an] angle … with M_1."

Moreover, US '846 at Col. 2, lines 6-7 teaches "Fig. 6 is a cross-sectional view of a three terminal device based on reflection-mode spin transfer." Thus US '846 Fig. 6 does not "disclose an array of magnetic memory elements" as asserted by the Examiner, but is only directed to a single three terminal device.

The Examiner further states that US '846 teaches in the ABSTRATCT "a plurality of heating elements for said array of magnetic memory elements." The ABSTRACT makes no reference to a plurality of heating elements or to an array of magnetic memory elements. The ABSTRACT has no teaching directed to heating at all.

The Examiner further states referring to US '846 Fig. 5 and 6 "said heating elements are included in the devices with said magnetic memory elements extending across the array." As stated above US '846 Fig. 6 is directed to a single device and not to an array of devices. Moreover US '846 Col. 2, lines 4-5 teaches "FIG 5. is a schematic of an elementary device …" Thus FIG. 5 does not show an array of devices.

The Examiner further states referring to US '846, Col. 5, lines 45-47 "where the heating elements are conductors." As stated above US '846 Col. 5, lines 45-47 have no teaching of heating elements.

The Examiner further states referring to US '846 Figure 5 "wherein the heating lines extend diagonally across the array." As stated above US '846 Fig. 6 is directed to a single device not to an array of devices thus cannot have a teaching directed to lines "extend diagonally across the array."

The Examiner further states referring to US '846 Col. 1, lines 16-20 and Col. 10, lines 2-9 "further comprising means for generating magnetic fields for switching selected memory elements, and second means for causing the heating elements to apply heat to the selected memory elements while the magnetic fields are being applied." As stated above the Examiner's statements are contradicted by the first sentence of The Summary of the Invention at Col. 1, lines 25-26, "This invention provides new means of dynamically remagnetizing or magnetically exciting … without the use of an externally applied magnetic field." There is no teaching in US '846 Col. 1, lines 16-20 or Col. 10, lines 2-9 that teaches "means for generating magnetic fields for switching selected memory elements." As noted above US '846 has no teaching of an array of memory elements and thus cannot teach selected switching. Moreover, since US '846 has no teaching of an array it cannot teach "second means for causing the heating elements to apply heat to the selected memory elements while the magnetic fields are being applied."

Thus applicants respectfully submit that US '846 does not anticipate applicants' claims and respectfully request this rejection be withdrawn.

Please charge any fee necessary to enter this paper and any previous paper to deposit account 09-0468.

If the above-identified Examiner's Action is a final Action, and if the above-identified application will be abandoned without further action by applicants, applicants file a Notice of Appeal to the Board of Appeals and Interferences appealing the final rejection of the claims in the above-identified Examiner's Action. Please charge deposit account 09-0468 any fee necessary to enter such Notice of Appeal.

In the event that this amendment does not result in allowance of all such claims, the undersigned attorney respectfully requests a telephone interview at the Examiner's earliest convenience.

MPEP 713.01 states in part as follows:

Where the response to a first complete action includes a request for an interview or a telephone consultation to be initiated by the examiner, … the examiner, as soon as he or she has considered the effect of the response, should grant such request if it appears that the interview or consultation would result in expediting the case to a final action.

Respectfully submitted,

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